

# Assignment 2

## POVs and Experience Prototypes

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### Team



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### Problem Domain

Our problem domain is education and accessibility. The technology available for those that are disabled is lacking. We looked initially at how to make education accessible for those that are visually and hearing impaired. From here, we moved on to discover ways to help the disabled in other aspects of their daily lives, thus granting them greater accessibility.

### Preliminary POV

We interviewed Mehran who is a professor at Stanford. We were amazed to realize that disabled students suffer in class more than out of class. It would be game changing if we could enhance their in-class experience.

### Additional Needfinding

Based on the feedback that we got last year from our teacher assistant, we decided to focus on people who are not related to stanford, and to go outside. In addition, we also expanded our interviewing process to include people who has

disability, but not necessarily connected with education. Moreover, we focused this time on prospective users rather than experts.

First, we met Dean Hudson who is a blind engineer in the area. The reason why we chose to interview him is that he is visually impaired. The interview with Dean gave us a very good perspective about everyday hardships that faces visually impaired people, and where they suffer the most. For example, finding dropped things, or knowing where he is and where he is going. He also mentioned that one of the main needs for disabled people is to feel independent.

Second, we also interviewed Saad Ghani, a college student at the University of Illinois at Chicago. We chose to interview him since he is completely hearing impaired. The interview with Saad gave us a good idea of the daily problems he faces with regards to attending lecture, interacting with other students, and performing daily activities as someone who is deaf. For example, he cannot attend lecture like other students do. Rather, he must read captions of a lecture after the fact or have someone translate it and present it into ASL.

## Revised POVs, HMW Statements, and Prototypes

Considering last week's interviews and the additional need finding interviews we have done this week, the most interesting POVs were:

### POV 1

We interviewed Michael who is a previous Stanford student. We were amazed to realize that he couldn't easily access digital documents in class. It would be game changing if we could help visually impaired people access written formats on their phones.

### HMWs

How might we...

- **reading documents easier for the visually impaired**
- **use other senses to make mobile phones more accessible**
- **design from scratch for visual impairment**
- make other people empathize with learning while visually impaired
- view data in different ways
- use a mobile phone to complement a white cane
- make accessibility tech enjoyable to use
- create a better way for visually impaired people to search on their phones

- find accessibility applications for visually impaired people
- force apple to build a system for the visually impaired
- control the phone using our minds

## Experience Prototype 1

This is StudyBuddy, your guide, for a better studying experience. Let's get started. In StudyBuddy, you tap to confirm, double tap to cancel



Tap once to start reading,  
Tap again to pause,  
Hold down to highlight specific parts,  
Swipe right to increase speed,  
Swipe left to rewind,  
To get back to normal speed,  
just tap

For this point of view, we decided to address our first “How Might We” statement, to make reading documents more accessible for the visually impaired on a mobile phone. With some of the HMWs in mind, we intended to design a mobile application experience which is (1) heavily reliant on senses complementary to sight, such as sound and haptics, and (2) which is designed from scratch for people with visual impairment, rather than being designed for sighted people and adding accessibility features as an afterthought. Our assumption with these design choices was that visually impaired people needed an interface that’s specifically tailored for them to be usable by them.

For our prototype, we created a low-fi storyboard for an application that would read aloud, navigate through, and annotate PDF documents. The application would work using only voice and different combinations of tapping on the screen.

To test the prototype, we created a “tutorial” for the application using slides on a computer, and would let the computer read aloud the text. We gave the user a phone with one button which produce a sound as long as it is touched, so that we knew how the user was tapping the screen, then simulated the application by picking the slide which would simulated the application’s response to the user’s tap.

We tested the prototype on Kartik, a Stanford student with vision impairment. We noticed that upon using the tutorial, he would always ask to repeat the instructions. He especially need to repeatedly learn the controls which we designed for controlling the

playback of the document. As soon as we actually reached the part where a document was read aloud, he wanted to stop using the application after only a little.

Getting his feedback, we realized that our initial assumption that designing our own UI the way we like for the visually impaired is counter-productive, since visually impaired people are already adapted to a certain interface which has been standardized across the smartphones industry. He also mentioned that he would prefer that accessibility options be added to an existing application rather than creating an accessible application from scratch to performs the same functions.



What we realized is that when designing for the visually impaired, it's better to create a user experience or a function which is highly novel and then make it accessible, rather than making an application which is highly accessible but banal.

## POV 2

We interviewed Zina who is a hearing-impaired college student. We were amazed to realize that hearing accessibility technology detracted from the social experience of hearing-impaired students in education. It would be game changing if we could make hearing accessibility technology more palatable to its users.

## HMWs

How might we...

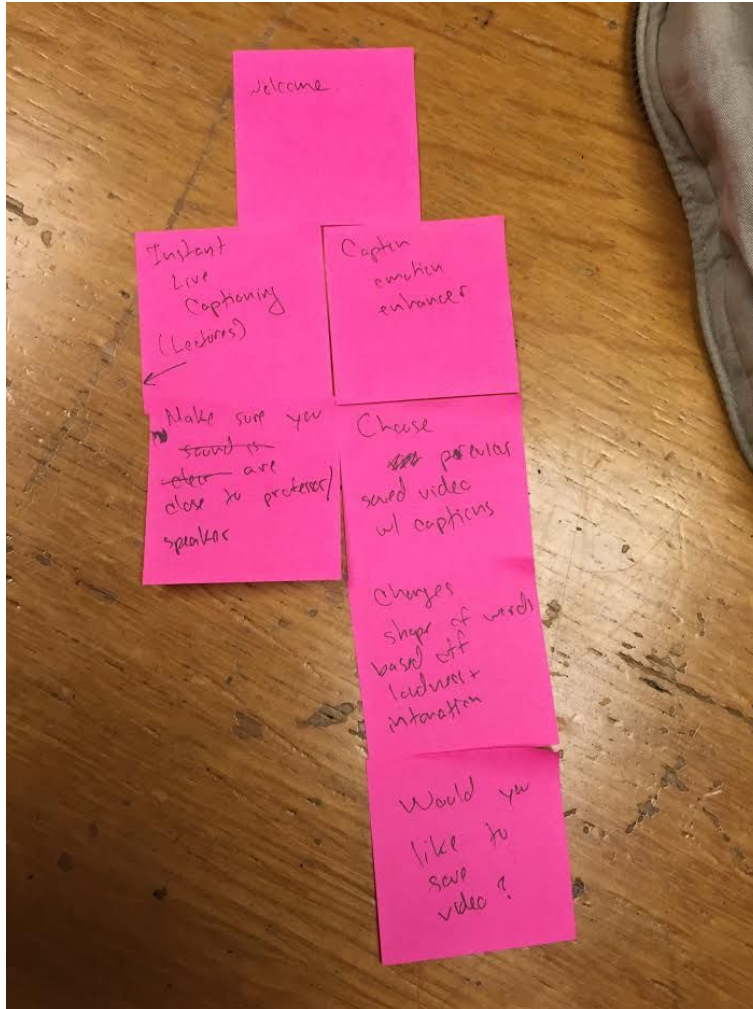
- **visualize emotion**
- **capture and portray a social atmosphere through a visual format**
- **translate American Sign Language into different sign languages**
- make it possible for them to experience lectures as others without hearing impairment would

- make it possible for them to control the volume of their surroundings (for those that aren't completely hearing impaired)
- make their driving experience safe (since they can't hear sudden happenings within their surroundings)
- give them a way to understand what is going on in a room (with regards to hearing)
- use their sense of sight to compensate for their lack of hearing during class
- make them comfortable not being able to hear instead of continuously longing to hear
- make the technology used by the hearing impaired unnoticeable and less of a distraction

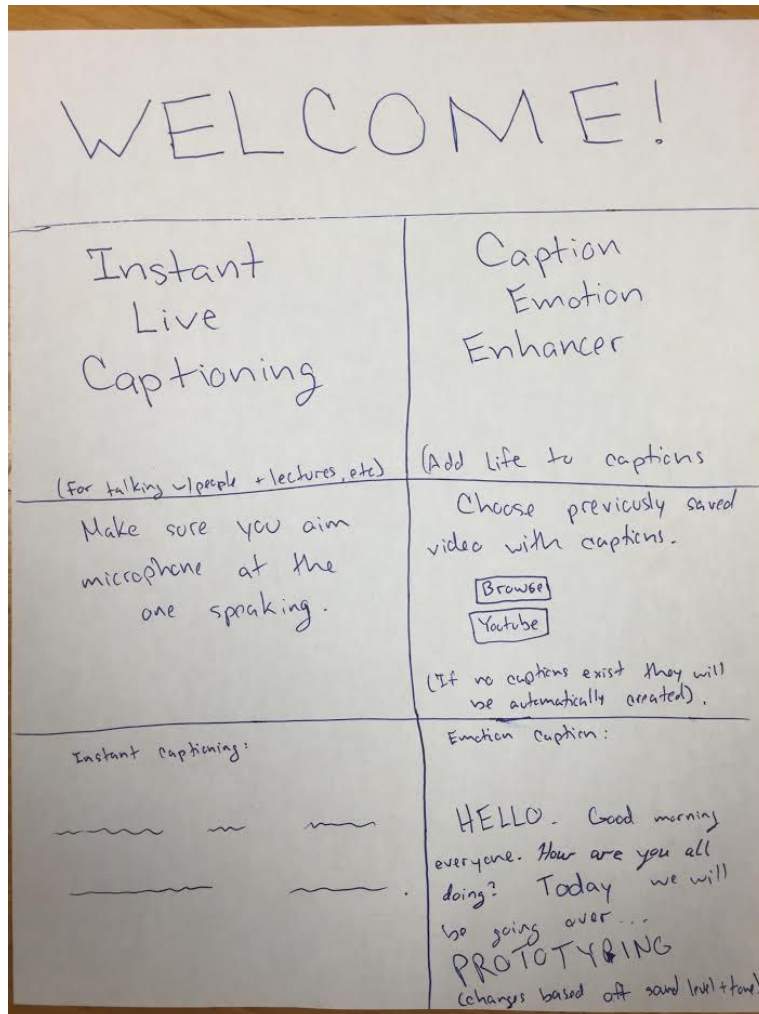
## Experience Prototype 2

For this experience prototype we tackled the problem of being unable to capture tone, style, and emotion through captions for those that are hearing impaired. This is relevant to every time they need to watch a class lecture with captions. We made the assumption that captions don't present material in an interesting and engaging manner for those with hearing impairment. They are incapable of (1) being part of the class atmosphere since they must wait for the lecture to be captioned or translated (to ASL) or (2) fully engaging with the lecture in more ways than simply obtaining the conveyed information (for the act of conveying information through utilizing specific tones, styles, and sound level is an essential part of communication). This prototype presents presents a way for the hearing impaired to instantly caption speech along with a way to add emotion and animate captions of a lecture or video.

In order to make the prototype app, we initially mapped out the screens you would navigate through on post-it notes and placed them in order:



From here we created a one page representation of the navigation and pages within our app:



The emotion aspect of our prototypes worked surprisingly well for the completely hearing impaired college student, Saad. As for Juleh, although she was hearing impaired, she had a cochlear implant which improved her hearing to some extent. For this reason, she did not find captioned lectures particularly useful since she utilizes the FM system to listen to the professor anyways. Furthermore, although they both liked the emotion enhanced captions, they expressed concern with the feasibility and ease of its creation (what would decided how the captions would be enhanced).

We realized that our assumption is not valid for all hearing impaired people. We now understand that emotion enhanced captions can be very interesting and engaging, but they may not be completely necessary. A new assumption thus emerged that we could make such captions entertaining and engaging enough so that they may be a direct substitute for lectures for all people.





### POV 3

We met Chris who is a previous high and middle school teacher, and a current PhD student. We were amazed to realize that the social aspect of the education process is as important as teaching. It would be a game changer if we can make disabled students and minorities feel that they fit in the school.

### HMWs

How might we...

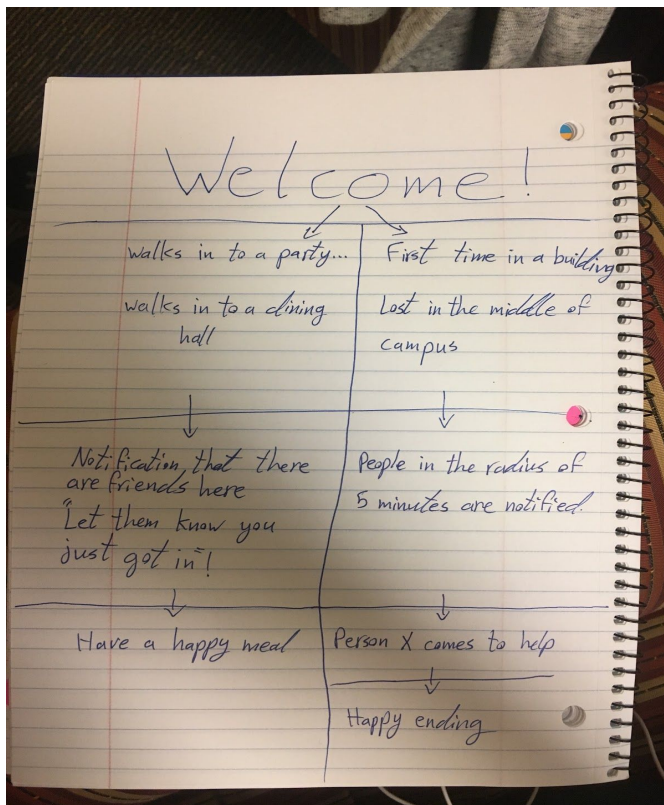
- **Create a positive digital social sphere**
- **Use crowdsourcing to make university students feel more welcome**
- **Help them get engaged in the classroom**
- Encourage them to talk about their disabilities without feeling uncomfortable
- Make other people empathize and understand their struggle



- Make them feel they are at home

### Experience Prototype 3

The HMW which we picked here was “HMW use crowdsourcing to make university students feel more welcomed”. We thought that crowdsourcing would be very helpful for people who need help, since the needs varies a lot from a user to another. In addition, the prototype that we came up with could be used by students who are looking to be more social, and not only disabled students. To tackle this problem, we had the idea of being able to locate your friends who are inside a public building (e.g. dining halls), and meet them instead of being alone. We also decided to include the possibility of sending help request to nearby people in case a disabled person needed some help such as navigating their way in a building that it’s their first time in it. We made the assumption that (1) a lot of times students would love to have a meal, or be in an event with someone rather than alone, and (2) friends might be near each other, but due to some issues they might be not aware of that. This app presents a way for people to interact socially with others, and urging them to meet. It also make disabled people feel a little bit safer since help is just a request away. In order to make this prototype, we first mapped out the different sections we wanna include:



We interviewed Zeshan Hussain and Kenneth Tea\*, both are minority groups students. The interview included showing them the part that talks about finding friends in the same building where we acted as if we were there friends, and they were getting into a dining hall. We once did this scenario pretending our app didn't exist, and once where our app existed. The users liked the fact that it makes it easier to locate friends, and socialize, and how all what it does is as simple as just notifying them to the existence of their friends. One thing they were concerned about is the privacy issue such that if they wanted to eat while working. One thing I learnt is that some users might want to explore and get to know others who are not their friends, so that should be enabled. Also, overall, privacy should be well defined such that you can specify who can see your location and who cannot.

## **Conclusion**

With the additional need-finding interviews outside of Stanford, we were able to find additional needs geared more toward accessibility users. With the additional research, we were able to expand our preliminary POV and create diverse POVs. Each POV had detailed HMWs that helped us find numerous solutions. With the top solutions for each, we created several prototypes and kept the best ones to test them with accessibility users. After the user prototype tests and feedback, we concluded that our engaging captioning of speech prototype was the best one.